

Direct reprogramming towards vascular progenitors for the treatment of ischemia

Grant Award Details

Direct reprogramming towards vascular progenitors for the treatment of ischemia

Grant Type: Early Translational III

Grant Number: TR3-05568

Project Objective: This DCF project is entitled "Direct reprogramming towards vascular progenitors for the treatment of ischemia". The major goals of this project are to develop protocols for the direct conversion of somatic cells into functional vascular progenitors, to evaluate the functionality of differentiated iPSCs as well as lineage converted vascular cells in vitro and in vivo, and to analyze tumorigenicity of differentiated iPSCs as well as lineage converted vascular cells in vitro and in vivo.

Investigator:

Name:	Juan Carlos Izpisua Belmonte
Institution:	Salk Institute for Biological Studies
Type:	PI

Disease Focus: Vascular Disease

Human Stem Cell Use: Directly Reprogrammed Cell

Cell Line Generation: iPS Cell

Award Value: \$2,340,000

Status: Closed

Progress Reports

Reporting Period: Year 1

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Reporting Period: Year 2

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Reporting Period: Year 3

Grant Application Details

Application Title:	Direct reprogramming towards vascular progenitors for the treatment of ischemia
Public Abstract:	<p>Angiogenesis or the generation of new blood vessels is a critical part of the normal healing process. Newly created vessels ensure the delivery of oxygen, nutrients, and specific repair signals to injured tissues. Indeed, even though additional repair mechanisms are required, such as replenishment of tissue-specific cell types, angiogenesis contributes to the healing of a number of different processes such as nerve regeneration, skin, muscle and bone repair among others. Insufficient angiogenesis is a hallmark of chronic wounds and often present in the elderly, people with high cholesterol, diabetes, and heavy drinkers and smokers. More than \$4 billion has been invested in research and development and over 600 clinical trials targeting a variety of disorders including diabetes-related complications, peripheral arterial disease, stroke and wound healing as a few examples, are currently under way. Most of the studies have focused on the development of molecules facilitating self-repair by increasing endogenous angiogenesis. Stem cell technologies open the possibility for the generation and engineering of blood vessels in vitro suitable for transplantation in specific local areas. Thus, even though stem cells technologies can allow for the large-scale generation of vessels suitable for the healing of a wide variety of disorders, safety concerns hamper their translation into the clinic.</p>
Statement of Benefit to California:	<p>Rarely does a new technology come along that has the potential to make such a major impact on human health like stem cell reprogramming does. The successful development of stem cell therapies for disorders in which the generation of new vessels is necessary for healing will have an obvious and direct effect on the patients and families affected. Furthermore, regenerative medicine techniques are not limited to the generation of new vasculature and bear the potential to treat a vast array of diseases including Parkinson's, Alzheimer's, diabetes and blood disorders. All of these disorders place a tremendous burden on the State in terms of health care cost. The idea of connecting basic discoveries in stem cell research to clinical applications is new and unique to the California initiative. As such, California is the primary beneficiary of this technological investment. We envision 2 major positive effects for Californians: (1) California patients will be privileged once stem cell therapies are developed and ready to be implemented. This will create a positive wave in the general perception and awareness as to the position of California and its medical institutions worldwide. (2) California will witness the growth of its technological/industrial infrastructure to develop new forms of treatments on the wave of new basic discoveries. This combination is powerful and dividends will be generated in due time in the form of revenue from health care delivery and intellectual property.</p>

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